Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously presented) A method of detail enhancement for an original image signal represented by a set of pixels, comprising the steps of:

(a) detecting image pixels that belong to a luminance transition range of an image edge;

(b) generating gain suppression factors for the detected pixels in the luminance transition range of the image edge; and

(c) performing image detail enhancement on the image pixels while selectively reducing enhancement of the detected image pixels in the luminance transition range relative to enhancement of other image pixels based on the gain suppression factors.

2. (Previously presented) The method of claim 1, further comprising the steps of:

selecting enhancement gain factors for the image pixels; and

combining the gain suppression factors with the corresponding enhancement gain factors to obtain adjusted gain factors;

wherein the steps of performing image detail enhancement further includes the steps of performing image detail enhancement on the image pixels based on

the adjusted gain factors to selectively reduce enhancement of the detected image pixels in the luminance transition range of the edge.

3. (Previously presented) The method of claim 2, wherein the step of detecting pixels further includes the steps of:

detecting a luminance transition range of the edge and a center pixel of the luminance transition range.

4. (Previously presented) The method of claim 3, wherein the step of generating a gain suppression factor for a detected pixel further includes the steps of:

for each pixel within the detected luminance transition range, generating a gain suppression factor based on: (i) the position of the pixel within the luminance transition range relative to the center pixel of the luminance transition range, (ii) the enhancement gain factor for that pixel, and (iii) the luminance contrast across the edge.

5. (Original) The method of claim 3, wherein:

the step of generating the gain suppression factors further includes the steps of selecting the gain suppression factors such that detail enhancement at the center pixel location in the luminance transition range is suppressed more than neighboring pixels in the luminance transition range, wherein for pixel locations farther away from the center pixel location detail enhancement suppression is further reduced.

6. (Original) The method of claim 5, wherein the gain suppression factors are selected to essentially eliminate detail enhancement suppression for pixels outside the detected luminance transition range.

7. (Original) The method of claim 3, wherein the step of generating the gain suppression factors further includes the steps of:

selecting a candidate gain suppression factor α_c for each pixel location within the detected luminance transition range as:

$$\alpha_c = |i| * (1-s) * 2/(N+1) + s$$

where:

N is the length of the luminance transition range,

i is the index for the location of a pixel p_i in the luminance transition range, $-\frac{N-1}{2} \leq i \leq \frac{N-1}{2}$, such that the index of the current pixel location is 0, and

s is a variable related to both the local luminance contrast and the pixel's enhancement gain factor, $0 \leq s \leq 1$.

8. (Original) The method of claim 7, wherein:

$$s = 1 - \max(0,\ \min(1,\ (d - T_1)/(T_2 - T_1)))$$

where:

T_1 and T_2 are predetermined threshold values, $T_2 > T_1 \geq 0$, and

d is the luminance contrast within the detected luminance transition range, as:

$$d = | p_{-\frac{N-1}{2}} - p_{\frac{N-1}{2}} | .$$

9. (Original) The method of claim 8, wherein the threshold values T_1 and T_2 are related to an enhancement gain factor K, as:

$$T_1 = C_1 / K \quad ,$$

$$T_2 = C_2 / K$$

where C_1 and C_2 are constants.

10. (Original) The method of claim 7, wherein the steps of generating the gain suppression factor for a detected pixel further includes the steps of:

selecting an initial gain suppression factor α;

upon generating each candidate suppression factor α_c for the pixel location, updating α as:

$$\alpha = \min(\alpha, \alpha_c) .$$

11. (Previously presented) The method of claim 2, wherein the step of performing detail enhancement for the original image signal *f* at a detected pixel further includes the steps of:

performing a low pass filter function on the image signal f to generate an unsharp image signal f_1;

determining the difference between the original image signal f and the unsharp signal f_1, as a different signal, wherein said difference signal represents image details;

selectively boosting the difference signal such that enhancement of the difference signal at the detected pixel locations is reduced relative to enhancement of other image pixels based on the gain suppression factors; and

adding the boosted signal to the original signal to obtain a detail enhanced image signal g.

12. (Original) The method of claim 11, wherein the enhanced image signal g is related to the original image signal f as:

$$g = (f - f_1) * K * \alpha + f$$

wherein:

$(f - f_1)$ is the difference signal,

K is the enhancement gain factor for the pixel, and

α is the gain suppression factor for the pixel.

13. (Original) The method of claim 1 wherein the step of detecting image pixels that belong to an image edge, further includes the steps of detecting image pixels that belong to a slant image edge.

14. (Previously presented) The method of claim 1, wherein:

the step of detecting image pixels that belong to an image edge further includes the steps of:

defining a two-dimensional window of pixels in the digital image;

determining a mean value for a plurality of pixels around a selected pixel inside said window;

based on the mean value, determining if the selected pixel is in an edge region in the window;

if the selected pixel is in an edge region, then determining if the selected pixel is essentially a center pixel in a luminance transition range of a slant edge;

if the selected pixel is essentially a center pixel in a luminance transition range of a slant edge, then determining the length of the luminance transition range of the slant edge; and

the step of generating gain suppression factors further includes, for each pixel within the luminance transition range, generating a gain suppression factor based on the position of the pixel within the luminance transition range relative to the center pixel of the luminance transition range;

the step of performing image detail enhancement on the image pixels includes

selectively adjusting enhancement of the detected image pixels relative to enhancement of other image pixels based on the gain suppression factors, such that the length of the luminance transition range is essentially maintained.

15. (Previously presented) A detail enhancement system for enhancing an original image signal represented by a set of pixels, comprising:

(a) a detector that detects image pixels that belong to a luminance transition range of an image edge;

(b) a generator that generates gain suppression factors for the detected pixels; and

(c) a detail enhancer that performs image detail enhancement on the image pixels while selectively reducing enhancement of the detected image pixels relative to enhancement of other image pixels based on the gain suppression factors.

16. (Original) The system of claim 15, wherein the detail enhancer combines the gain suppression factors with selected enhancement gain factor to obtain adjusted gain factors, and performs image detail enhancement on the image pixels based on the adjusted gain factors to selectively reduce enhancement of the detected image pixels.

17. (Previously presented) The system of claim 16, wherein the detector detects a luminance transition range of the edge and a center pixel of the luminance transition range.

18. (Previously presented) The system of claim 17, wherein the generator generates a gain suppression factor for a pixel within the detected luminance transition range based on: (i) the position of the pixel within the luminance transition range relative to the center pixel of the luminance transition range, (ii) the enhancement gain factor for that pixel, and (iii) the luminance contrast across the edge.

19. (Previously presented) The system of claim 17, wherein the generator selects the gain suppression factors such that detail enhancement at the center pixel location in the luminance transition range is suppressed more than neighboring pixels in the luminance transition range, wherein for pixel locations farther away from the center pixel location detail enhancement suppression is further reduced.

20. (Original) The system of claim 19, wherein the gain suppression factors are selected to essentially eliminate detail enhancement suppression for pixels outside the detected luminance transition range.

21. (Original) The system of claim 17, wherein the generator generates the gain suppression factors by selecting a candidate gain suppression factor α_c for each pixel location within the detected luminance transition range as:

$$\alpha_c = |i| * (1-s) * 2/(N+1) + s$$

where:

N is the length of the luminance transition range,

i is the index for the location of a pixel p_i in the luminance transition range, $-\frac{N-1}{2} \leq i \leq \frac{N-1}{2}$, such that the index of the current pixel location is 0, and

s is a variable related to both the local luminance contrast and the pixel's enhancement gain factor, $0 \leq s \leq 1$.

22. (Original) The system of claim 21, wherein:

$$s = 1 - \max(0,\ \min(1,\ (d - T_1)/(T_2 - T_1)))$$

where:

T_1 and T_2 are predetermined threshold values, $T_2 > T_1 \geq 0$, and

d is the luminance contrast within the detected luminance transition range, as:

$$d = | p_{-\frac{N-1}{2}} - p_{\frac{N-1}{2}} |.$$

23. (Original) The system of claim 22, wherein the threshold values T_1 and T_2 are related to an enhancement gain factor K, as:

$$T_1 = C_1 / K \quad ,$$

$$T_2 = C_2 / K$$

where C_1 and C_2 are constants.

24. (Original) The system of claim 21, wherein the generator generates the gain suppression factor for a detected pixel by selecting an initial gain suppression factor α, and upon generating each candidate suppression factor α_c for the pixel location, updating α as $\alpha = \min(\alpha, \alpha_c)$.

25. (Previously presented) The system of claim 16, wherein the detail enhancer performs detail enhancement for the original image signal at a detected pixel, the detail enhancer comprising:

a filter that performs a low pass filter function on the image signal to generate an unsharp image signal f_1;

a difference node that determines the difference between the original image signal and the unsharp signal f_1, as a difference signal, wherein said difference represents image details;

a combiner that selectively boosts the difference signal based on the gain suppression factors such that enhancement of the difference signal at the detected pixel locations is reduced relative to enhancement of other image pixels; and

a summing node that combines the boosted signal to the original image signal to obtain a detail enhanced image signal g.

26. (Previously presented) The system of claim 25, wherein the enhanced image signal g is related to the original image signal as:

$$g = (f - f_1) * K * \alpha + f$$

wherein:

f is the original image signal,

$(f - f_1)$ is the difference signal,

K is the enhancement gain factor for the pixel, and

α is the gain suppression factor for the pixel.

27. (Previously presented) The system of claim 15, wherein to detect image pixels that belong to an image edge, the detector defines a two-dimensional window of pixels in the digital image, determines a mean value for a plurality of pixels around a selected pixel inside said window, based on the mean value, determines if the selected pixel is in a an edge region in the window, if the selected pixel is in an edge region, then the detector determines if the selected pixel is essentially a center pixel in a luminance transition range of a slant edge, and if the selected pixel is essentially a center pixel in a luminance transition range of a slant edge, then the detector determines the length of the luminance transition range of the slant edge.

28. (Previously presented) The system of claim 27, wherein:

the generator is configured to generate gain suppression factor for each pixel within the luminance transition range based on the position of the pixel within the luminance transition range relative to the center pixel of the luminance transition range; and

the detail enhancer is further configured to perform image detail enhancement on the image pixels by selectively adjusting enhancement of the detected image pixels relative to enhancement of other image pixels based on the gain suppression factors, such that the length of the luminance transition range is essentially maintained.